

New species and combinations in New Caledonian *Metrosideros* and *Carpolepis* (Myrtaceae) with notes on other species

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Summary : *Metrosideros* subgenus *Carpolepis* Dawson, endemic to New Caledonia, is raised to generic status and one new species, *Carpolepis tardiflora* Dawson is described. Seven new species and one new variety of New Caledonian *Metrosideros* are described : *Metrosideros punctata* Dawson, *M. cherrieri* Dawson, *M. brevistylis* Dawson, *M. longipetiolata* Dawson, *M. patens* Dawson, *M. paniensis* Dawson, *M. cacuminum* Dawson and *M. operculata* var. *francii* Dawson. The following new combinations are also made : *Carpolepis elegans* (Montr.) Dawson, *C. laurifolia* (Brongniart & Gris) Dawson, *C. laurifolia* var. *demonstrans* (Tison) Dawson comb. & stat. nov. Notes on other species of the two genera and a key to all New Caledonian species are also provided.

Résumé : *Metrosideros* sous-genre *Carpolepis* Dawson, endémique de la Nouvelle-Calédonie, est élevé au niveau générique et une nouvelle espèce, *Carpolepis tardiflora* Dawson est décrite. Sept nouvelles espèces et une nouvelle variété de *Metrosideros* néo-calédoniens sont décrites : *Metrosideros punctata* Dawson, *M. cherrieri* Dawson, *M. brevistylis* Dawson, *M. longipetiolata* Dawson, *M. patens* Dawson, *M. paniensis* Dawson, *M. cacuminum* Dawson et *M. operculata* var. *francii* Dawson. Les combinaisons suivantes sont aussi faites : *Carpolepis elegans* (Montr.) Dawson, *C. laurifolia* (Brongniart & Gris) Dawson, *C. laurifolia* var. *demonstrans* (Tison) Dawson comb & stat. nov. Une clé de détermination et des notes relatives à toutes les espèces de ces deux genres sont aussi présentées.

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With sixteen, perhaps seventeen species of *Metrosideros*, seven of them new, New Caledonia has the strongest representation of the genus. New Zealand, in second place, has ten species. DAWSON (1976) took a wide view of the genus believing that any consideration of subdivision should await the results of more detailed, particularly anatomical, studies. Three subgenera were recognised : *Metrosideros*, *Mearnsia* (reduced from generic status) and *Carpolepis* (newly described). It is now thought that subgenus *Carpolepis*, with three species restricted to New Caledonia, warrants generic status. The most readily observable distinguishing features of the genus are : the yellow flowers, compared with the red or pink to white flowers of the two remaining subgenera of *Metrosideros* ; the thick very unequal sepals ; the strongly winged seeds ; and the pattern of seasonal growth from scaly resting buds, whereby groups of lateral inflorescences, subtended by bracts, form first, followed by leaves, then a dormant vegetative bud. Two of the species of *Carpolepis* are often epiphytic with roots descending to the ground. The typical subgenus of

Metrosideros is fairly homogeneous having bud scales and a distinctive pseudodichotomous, sympodial branching pattern. As in *Carpolepis* the inflorescences are subtended by bracts (*M. cherrieri* sp. nov. is an exception) and are lateral on axes ending in dormant or abortive vegetative buds, but unlike *Carpolepis* no leaves intervene between the inflorescences and the terminal bud. Many species of subgenus *Metrosideros* are occasionally to frequently epiphytic, eventually becoming free-standing, and possibly all of them are able to produce free-hanging aerial roots. All species and varieties of *Metrosideros* on high isolated islands in the central Pacific belong to this subgenus.

Subgenus *Mearnsia* is more heterogeneous and several sections are recognised. Generally growth is monopodial, bud scales few or wanting, and inflorescences are terminal, lateral or ramiflorous. Bud scales, where present, and bracts are smaller and narrower than those of *Carpolepis* and subgenus *Metrosideros*. No epiphytes have been recorded, but some species in New Zealand and New Guinea are root-climbing lianes.

CARPOLEPIS (Dawson) Dawson, *stat. nov.*

- *Metrosideros* subg. *Carpolepis* DAWSON, *Blumea* 23 : 8 (1976).
- *Ballardia*¹ MONTR., *Mém. Acad. Lyon* 10 : 205 (1860).

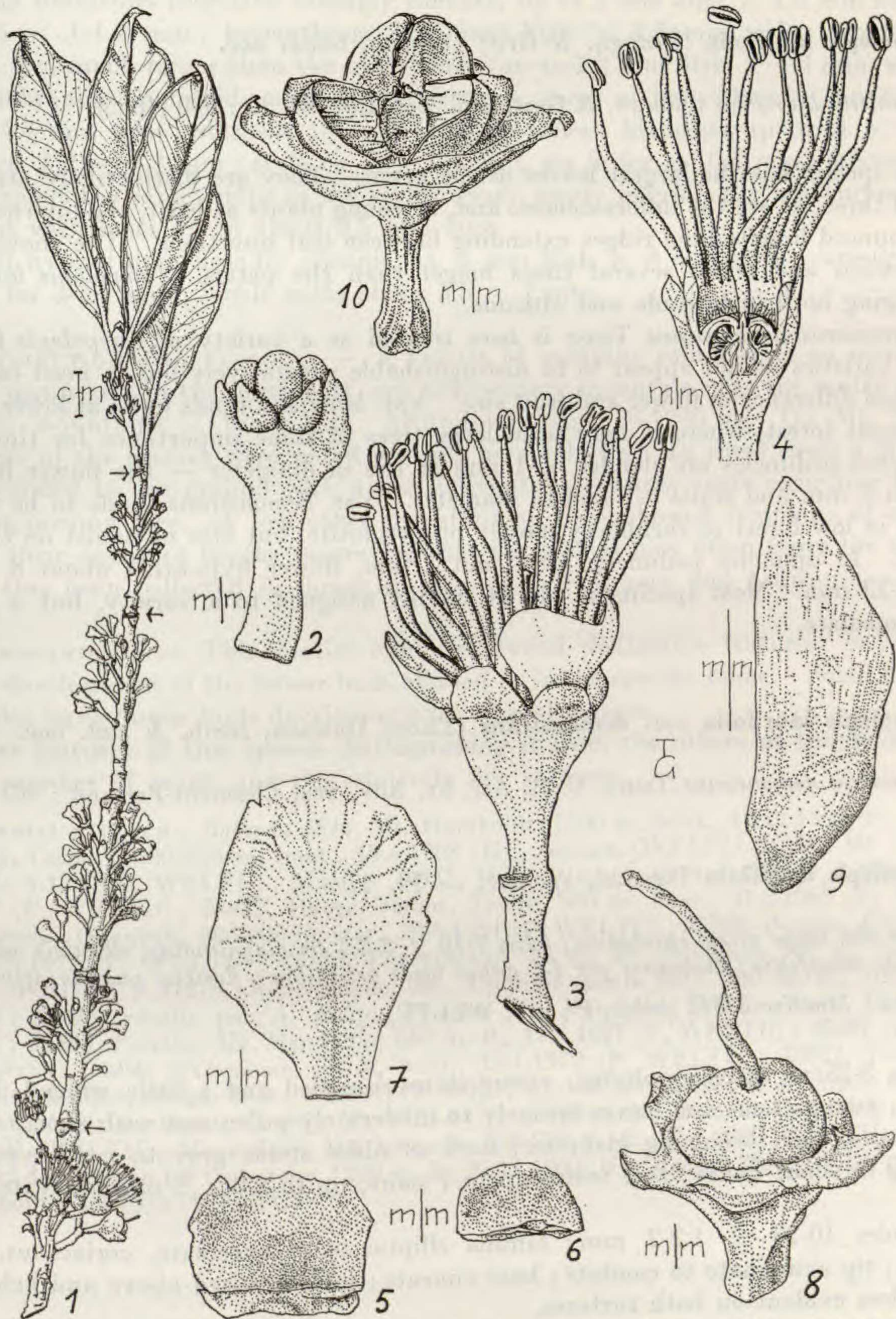
TYPE SPECIES : *Carpolepis elegans* (Montr.) Dawson.

Carpolepis elegans (Montr.) Dawson, *comb. nov.*

- *Ballardia elegans* MONTR., *Mém. Acad. Lyon* 10 : 205 (1860).
- *Metrosideros elegans* (MONTR.) BEAUV., *Genera Montrouzierana, Plantarum Novae Caledoniae*, *Ann. Soc. Bot. Lyon* 26 : 39 (1901).
- *Metrosideros laurifolia* var. *minor* BRONGN. & GRIS, *Bull. Soc. Bot. Fr.* 12 : 300 (1865).

The most distinctive feature of this species is the shortness of the stamens which are no longer than the petals. The type locality is the Ile Art and on the main island the species has been recorded from scattered localities from Port Boisé at the southern tip to Mt. Mandjélia in the far north. Near the sea it grows on calcareous and peridotite rocks and on the latter at Port Boisé may be within a metre of the water. Inland in rain forest up to about 700 m altitude *Carpolepis elegans* is frequently epiphytic with a slender scaly root descending to the ground.

1. *Ballardia* Montr. was named for the chemist BALARD as was the earlier *Balardia* Cambess. (1829). MONTROUZIER, located at the time in a remote part of New Caledonia, is unlikely to have seen proofs of his publication and the article concerned is full of misprints. Thus *Ballardia* is probably a typographic error for *Balardia* and in accordance with Art. 73.1, 73.3, 73.7 is treated as a later homonym of *Balardia* Cambess.



Pl. 1. — *Carpolepis tardiflora* Dawson : 1, branchlet showing slow development of flower buds over several seasons ; each season's growth is delimited by the groups of bud scale scars indicated by arrows ; 2, immature inflorescence showing 3 flower buds, 2 bracts and 2 bracteoles ; 3, flower habit ; 4, flower (L. S.) ; 5, large sepal ; 6, small sepal ; 7, petal ; 8, immature fruit ; 9, fertile seed ; 10, dehiscent capsule. (1-7, MacKee 32843 ; 8, 9, MacKee 20482 ; 10, MacKee 31216).

Carpolepis laurifolia (Brongn. & Gris) Dawson, *comb. nov.*

— *Metrosideros laurifolia* BRONGN. & GRIS, Bull. Soc. Bot. Fr. 12 : 300 (1865).

This species has the largest leaves of the genus. They are distinctively arranged in whorls of three, as are the inflorescences, and, in young plants at least, the internodes have six pronounced longitudinal ridges extending between leaf insertions. The showy flowers have stamens and styles several times longer than the petals. *Carpolepis laurifolia* is wide ranging both in latitude and altitude.

Metrosideros demonstrans Tison is here treated as a variety of *Carpolepis laurifolia*. The two varieties do not appear to be distinguishable vegetatively but in most cases there is a marked difference in flower and fruit size. Var. *laurifolia* tends to be at lower altitudes in tall moist forest, where it may form large trees of some importance for timber. Its inflorescence peduncles are slender — 1 mm or less in diameter — the flower hypanthia are about 4 mm and fruits 5-7 mm in diameter. Var. *demonstrans* tends to be at higher altitudes in low forest or shrubbery mostly on peridotite, but also on schist on the Roche Ouaième. In diameter peduncles are about 2 mm, flower hypanthia about 8 mm and fruits 11-13 mm. Most specimens can be readily assigned to a variety, but a minority are intermediate.

Carpolepis laurifolia var. **demonstrans** (Tison) Dawson, *comb. & stat. nov.*

— *Metrosideros demonstrans* TISON, C. R. Ass. Fr. Adv. Sci., Clermont-Ferrand : 462 (1876).

Carpolepis tardiflora Dawson, *sp. nov.* — Pl. 1.

Arbor alta saepe primo epiphytica ; foliis 7-10 × 2-3.5 cm magnitudine, ellipticis vel oblanceolatis, nervis manifestis ; alabastris per 4-5 annos tarde orientibus ; floribus pusillis, tripetalis.

TYPUS : MacKee 32843 (holo-, P ; iso-, WELTU).

Tree, 8-35 m, often epiphytic ; young stems 4-angled and a little winged, becoming rounded ; young stems and leaves sparsely to moderately pubescent with short, appressed silvery hairs, soon becoming glabrous ; bark of older stems grey to red-brown, rough, detaching in small flakes ; bud scales up to 7 pairs, up to 13 × 5 mm, obovate to oblanceolate.

Petioles 10-20 × 1.2-2 mm ; lamina elliptic to oblanceolate, coriaceous, 7-10 × 2-3.5 cm ; tip acuminate to caudate ; base cuneate ; midrib raised above and below, veins more or less evident on both surfaces.

Inflorescences 4-6 pairs, each with 3 flowers ; flower buds developing gradually for several seasons, sometimes not opening for 4 or 5 years after they first appear ; peduncles, bracts and sepals glabrous or glabrescent, pedicels and hypanthia initially densely pubescent with short appressed silvery hairs, becoming glabrous ; peduncles 5-10 × 0.9-1.3 mm ;

bracts and bracteoles lingulate, strongly concave, up to 2 mm long \times 1.8 mm wide; pedicels 2-2.5 \times 1-1.2 mm; hypanthium 3.5-4 mm high \times 4-5 mm wide; sepals broadly rounded, two much larger than the other three (up to 2.3 mm high \times 4.3 mm wide) and with membranous, petaloid margins; petals three, more or less orbicular, up to 4.9 mm high \times 4.3 mm wide; stamens 18-22 in a single series; filaments up to 11 \times 0.8 mm; anthers ca. 1.2 \times 0.9 mm; style ca. 7 \times 0.7 mm, set in for ca. 0.8 mm; stigma slightly convex, about the same width as the style; ovary nearly inferior, the free surface densely pubescent with hairs up to about 0.5 mm long.

Fruit hypanthium broadly obconic, ca. 4 mm high \times 8 mm wide; capsule strongly exserted for 3-3.5 mm; fertile seeds about 3.5 \times 1 mm.

DISTRIBUTION AND ECOLOGY. — A species of montane rain forests on several metamorphic mountains in the north east, one sedimentary mountain near the centre and three peridotite mountains in the south. Altitudinal range 50-1200 m. On Mt. Mandjélia some trees of the species were noted growing as epiphytes. In these cases a stout main root descended to the ground with a few horizontal secondary roots encircling the trunk of the supporting tree. A few other free-standing trees showed remnants of secondary roots on their apparent trunks suggesting that the species may often begin life as an epiphyte. Has been collected in flower in December, February and April.

OBSERVATIONS. — This species exhibits several distinctive features, most notably the slow development of the flower buds alluded to in the specific name. Some *Eucalyptus* species also have flower buds developing over several seasons.

Other features of this species distinguishing it from the others of the genus are the reduced number of petals and the relatively few stamens.

MATERIAL STUDIED : *Balansa 1813*, Mt. Humboldt, 1200 m, bout., 12.10.1869 (P); *Bernardi 12812*, Mt. Colnett, 500-950 m, bout., 19.4.1968 (K); *Dawson (WELTU 14335)*, Mt. Mandjélia, 700 m, fl., 4.12.1982 (WELTU); *MacKee 19658*, Haute Diahot, forêt de Tendé, 5-600 m, bout., 10.9.1968 (P, WELTU); *20482*, Haute Diahot, Tendé, 500 m, bout., 31.3.1969 (P, WELTU); *23743*, Pouébo, Ouangati, 800-900 m, ster., 26.5.1971 (P, WELTU); *25209*, Pouébo, Expl. Frouin, bout., 12.4.1972 (P, WELTU); *25743*, Ponérihouen, E. du Mt. Aoupinié, 900 m, bout., 6.11.1972 (P, WELTU); *31216*, Ponérihouen, Mt. Aoupinié (pente Est), 700 m, fr., 10.5.1976 (P, WELTU); *32045* (récolté par A. Rolly), Pouébo, Mt. Mandjélia, 700 m, ster., 19.8.1976 (P, WELTU); *32843*, Pouébo, Mt. Mandjélia, 650 m, fl., 17.2.1977 (P, WELTU); *36407* (récolté par J.-F. Cherrier), vallée d'Ouaième, 50 m, bout., 18.1.1979 (P, WELTU); *38921*, Ponérihouen, haute vallée de Mou, 600 m, bout., 7.4.1981 (P, WELTU); *40010* (récolté par R. Nasi), Mt. Colnett (pente Est), 1100 m, bout., 11.1981 (P, WELTU); *40189*, crête Dzumac-Ouin, 900 m, bout., 6.1.1982 (P, WELTU); *Morat 6558*, Mt. Ignambi, 600-750 m, fl., 15.4.1980 (WELTU); *Schlechter 15508*, Auf den Bergen bei Oubatche, 1200 m, fl., 20.12.1902 (K); *Veillon 2660*, Ninga, pente N.E., 1200 m, bout., 8.6.1972 (WELTU).

METROSIDEROS Banks ex Gaertn.

Fruct. I : 170, *tab.* 34 (1788).

Subgenus **METROSIDEROS**

From New Zealand, Lord Howe Island, New Caledonia, the Solomons and the Bonins in the west, to Hawaii and Tahiti in the east.

Metrosideros nitida Brongn. & Gris

Bull. Soc. Bot. Fr. 11 : 182 (1864).

A widely distributed species which differs from others of the subgenus in New Caledonia in the large size of some trees, the relatively large undulate leaves and long inflorescence peduncles. Plants in ultrabasic regions generally have thicker leaves than those on other substrates.

Metrosideros punctata Dawson, *sp. nov.* — Pl. 2.

Frutex vel arbor parva; ramunculis rotundatis, glandibus oleosis prominulis instructis; foliis 2.5-3.5 × 0.9-1.4 cm magnitudine obovatis vel oblanceolatis glandibus oleosis subter prominulis; filamentis staminum 12-22 mm longis, rubris; capsulis aliquantum inclusis.

TYPE: MacKee 23062 (holo-, P; iso-, WELTU).

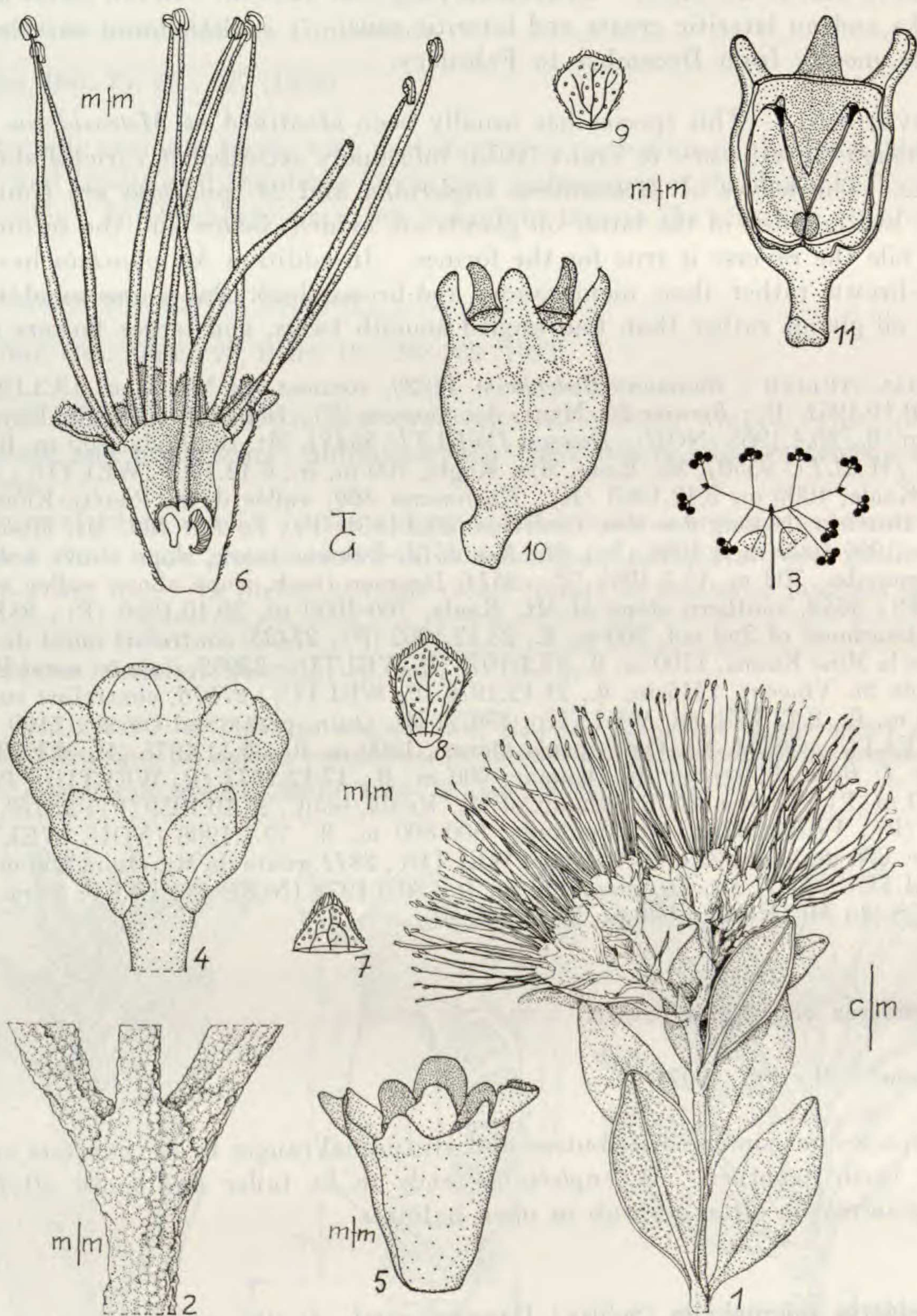
Shrub to small tree, 1-6 m. Bark of young stems pale brown separating in thickish flakes; twigs, bud scales and leaves with dense appressed, pale grey hairs when young, soon becoming glabrous; twigs rounded, often with prominent oil glands; bud scales 4-5 pairs, up to 5 × 2 mm, obovate to spathulate, rounded at the tip.

Petioles 2.5-5 × 1-1.5 mm; lamina obovate to oblanceolate, 2.5-3.5 × 0.9-1.4 cm; tip acute to a little acuminate; base cuneate; margins narrowly inrolled, upper surface shiny with evident veins, lower surface dull with obscure veins but prominent oil glands.

Compound inflorescence axis 3-6 × 2 mm, bearing 2, sometimes 3, pairs of 3-flowered cymes; axes, exterior hypanthium, sepals and petals with a dense appressed pale grey tomentum; peduncles 3-8 × 1-1.5 mm; bracts and bracteoles oblanceolate to obovate, obtuse to rounded, 3-5 × 2-2.5 mm; pedicels about 1.5 × 1 mm; hypanthium 3.5-5 × 3.5-4.5; sepals obtuse to rounded, 1.5-2 × 1.5 mm; petals 2-2.5 × 2-2.5 mm, bright red; stamens 17-25 in a single series; filaments 12-22 × 0.3 mm, bright red; anthers about 1 × 0.5 mm; style 18-20 × 0.4 mm, bright red; ovary semi-superior with the free surface densely pubescent.

Fruit hypanthium 5-6.5 × 4.5-5 mm, glabrous or glabrescent with oil glands and veins more or less prominent; sepals prominent, strongly incurved; capsule included, apex a little below hypanthial rim; fertile seeds about 3 × 0.7 mm.

DISTRIBUTION AND ECOLOGY. — This species is well represented on mountains in the southern ultrabasic region, but also occurs on some of the more isolated ultrabasic massifs



Pl. 2. — *Metrosideros punctata* Dawson : 1, foliage and inflorescences ; 2, twigs showing roughness caused by oil glands ; 3, diagram of a pair of compound inflorescences adjacent to a dormant or abortive branch apex ; the latter and the similar buds at the tip of each compound inflorescence are shown as black triangles ; 4, inflorescence at bud stage ; 5, flower habit (stamens and styles removed) ; 6, flower (L. S.) ; 7, sepals ; 8, bract ; 9, petal ; 10, fruit habit ; 11, fruit with one side removed. (All WELTU 9548).

in the northern half of the island. Altitudinal range 500-1200 m. In low forest and maquis among rocks and on lateritic crusts and lateritic soils.

Flowers mostly from December to February.

OBSERVATIONS. — This species has usually been identified as *Metrosideros engleriana* Schltr. although GUILLAUMIN & VIROT (1953) informally accorded it varietal status within that species. The leaves of *Metrosideros engleriana* and *M. punctata* are similar in size and shape, but in those of the latter oil glands are evident below and the secondary veins obscure, while the reverse is true for the former. In addition *M. punctata* has relatively thick pale-brown rather than membranous red-brown bark flakes, rounded twigs with prominent oil glands rather than four-angled smooth twigs, and larger flowers and fruits.

MATERIAL STUDIED : *Baumann-Bodenheim 11220*, sommet du Mt. Mou, 13.3.1950 ; *15688*, Mt. Mou, 30.10.1951 (P) ; *Bernier 25*, Mgne. des Sources (P) ; *Blanchon 1576*, Pic Poya, Mt. Boulinda, 926 m, fl., 26.4.1965 (NOU) ; *Dawson (WELTU 9548)*, Mt. Boulinda, 800 m, fl., 8.12.1970 (WELTU) ; *(WELTU 9550)*, Mt. Bouo, Mts. Koghi, 700 m, fr., 6.12.1967 (WELTU) ; *Green 1811*, top of Mt. Kaala, 1000 m, 9.12.1963 (K) ; *Hürlimann 860*, vallée de la Pouéta-Kouré, 5.2.1951 (P) ; *1116*, Dumbéa, le long des Mts. Couvélé, 29.3.1951 (P) ; *Le Rat 469*, Mt. Mou (P) ; *2593*, Mt. Dzumac, 900-1000 m, 1.1906 (P) ; *MacKee 2512*, Dzumac track, slope above head of valley of Koélagoguamba, 700 m, 15.5.1955 (P) ; *2514*, Dzumac track, slope above valley of Couvélé, 15.5.1955 (P) ; *5554*, southern slope of Mt. Kaala, 700-1000 m, 20.10.1956 (P) ; *9814*, Dzumac path, neighbourhood of 2nd col, 900 m, fl., 23.12.1962 (P) ; *21433*, contrefort ouest de Mé Maoya, au-dessus de la Mine Emma, 1100 m, fl., 13.1.1970 (P, WELTU) ; *23062*, sommet entre Pic Camboui et la Dent de St. Vincent, 1214 m, fl., 21.12.1970 (P, WELTU) ; *27916*, contrefort sud du Humboldt, 1250 m, fl., 8.12.1973 (P, WELTU) ; *29077*, Mt. Ouin (pente Sud-Ouest), 1100 m, fr., 11.8.1974 (P, WELTU) ; *30354*, Mt. Ouin (pente Ouest), 1000 m, fl., 30.11.1975 (P, WELTU) ; *34434* (récolté par *J. Begaud*), sentier du Dzumac, 900 m, fl., 17.12.1977 (P, WELTU) ; *Pancher 524*, Koghi, 1000 m (P) ; *Thorne 28210*, summit of Mt. Kaala, bout., 23.10.1959 (P) ; *28510*, Mt. Koghi, ca. 900 m (P) ; *Veillon 1762*, Mt. Boulinda, 500-800 m, fl., 22.4.1968 (NOU, WELTU) ; *2145*, Mt. Dzumac, 800 m, bout., 27.5.1970 (NOU, WELTU) ; *2811*, route de Mt. Ouin, 800 m, fl., 2.1973 (NOU, WELTU) ; *3551*, Mt. Dzumac, 800 m, fr., 30.3.1978 (NOU, WELTU) ; *Virot 1319*, près du sommet S. du Mt. Kaala, 1000 m, 2.11.1943 (P).

Metrosideros engleriana Schltr.

Bot. Jahrb. 39 : 205 (1907).

This species has similar distribution and altitudinal ranges to *M. punctata* and the two sometimes occur together. *M. engleriana* tends to be taller and more often in forest while *M. punctata* is often a shrub in open habitats.

Metrosideros microphylla (Schltr.) Dawson, comb. & stat. nov.

— *Metrosideros engleriana* var. *microphylla* SCHLTR., Bot. Jahrb. 39 : 206 (1907).

With its dense, rounded crowns, very small leaves and flowers single instead of in groups of three, specific status seems warranted in this case. Mid to higher altitude shrubbery and low forest on ultrabasic mountains in the south.

Metrosideros humboldtiana Guillaumin

Bull. Soc. Bot. Fr. 85 : 627 (1938).

The strongly revolute leaves with persistent grey tomentum on the undersides, the large bud scales and bracts and the dense silver grey pubescence of the flower make this a well-marked species. In shrubbery on a few mountain tops in the southern ultrabasic region.

Metrosideros oreomyrtus Däniker

Viert. Nat. Ges. Zürich 78, Beibl. 19 : 308-309 (1933).

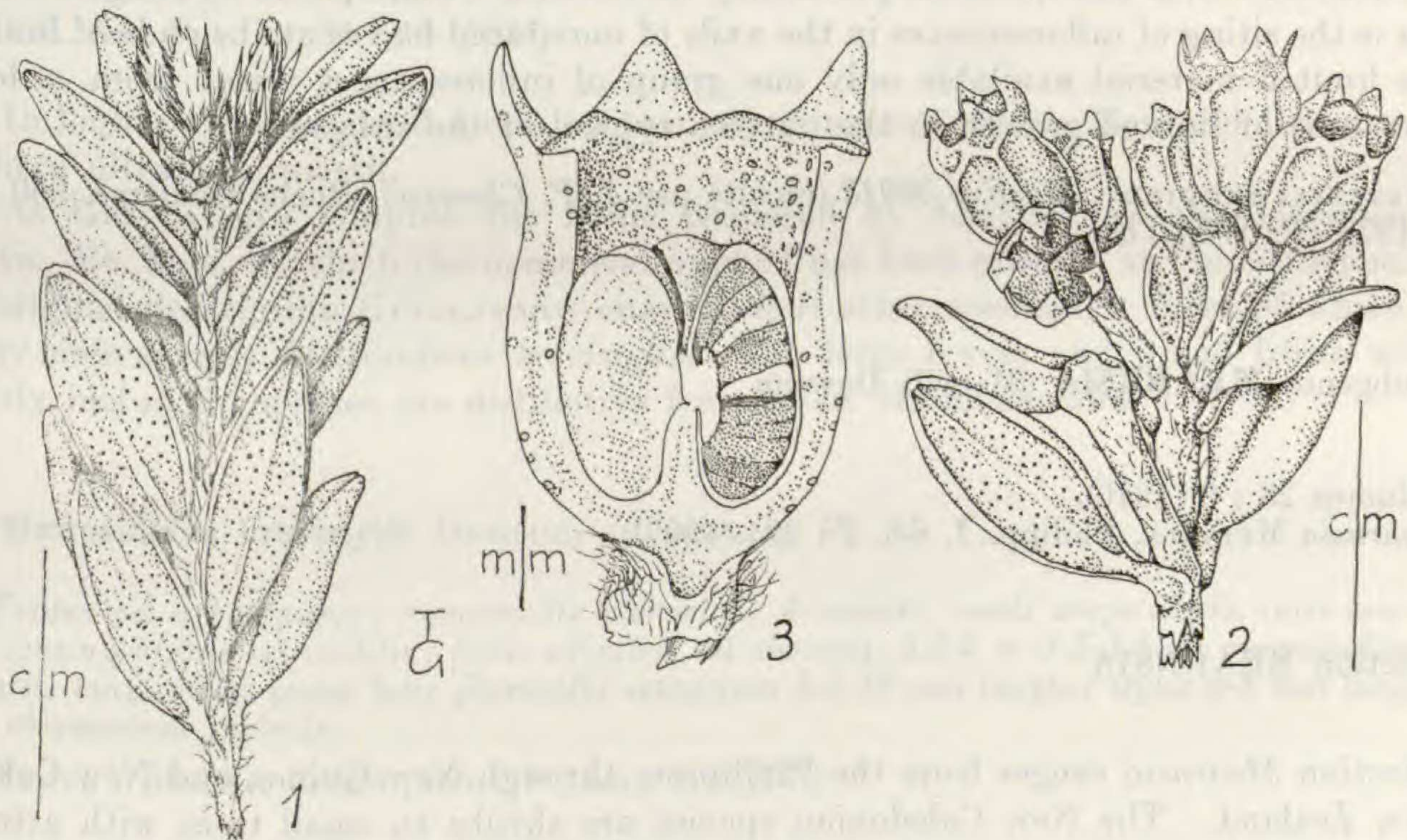
This tree species is distinctive in several respects : strongly winged twigs ; protuberant leaf, bud scale and bract scars ; almost circular thick bracts and bracteoles ; and small, white flowers.

Like several other species in the subgenus, *Metrosideros oreomyrtus* is sometimes epiphytic with a stout main ground root from which slender horizontal roots girdle the trunk of the supporting tree. In higher altitude cloud forests at scattered localities throughout.

Metrosideros cherrieri Dawson, *sp. nov.* — Pl. 3.

Frutex ; foliis 0.8-1 × 0.35 cm magnitudine, ellipticis glandibus oleosis subter prominulis ; inflorescentiis plerumque ad apicem ramulorum foliatorum axillaribus ; capsulis profunde inclusis.

TYPE : *Cherrier in MacKee 36013* (holo-, P ; iso-, WELTU).



Pl. 3. — **Metrosideros cherrieri** Dawson : 1, habit of branchlet with a pair of developing vegetative buds ; 2, group of lateral inflorescences at end of leafy branch ; 3, fruit, L. S. (All *MacKee 36013*).

Shrub. Bark of young stems red-brown separating in thin flakes ; twigs, bud scales and leaves with dense, appressed, silvery hairs when young, hairs tending to persist on the stems, the leaves gradually becoming glabrous ; twigs rounded ; bud scales up to 5 pairs, up to 3.5×1 mm, lanceolate, acute.

Petiole $2-2.3 \times 0.6-0.7$ mm ; lamina elliptic, $0.8-1 \times 0.3-0.35$ cm ; apex acute ; base obtuse ; margins narrowly revolute ; upper surface dull to glossy with veins obscure ; lower surface dull with obscure veins and prominent oil glands, the latter also prominent on the petioles.

Flowers not seen. Compound inflorescence axis (at fruiting stage) up to 7×1.2 mm ; bearing 1 or 2 pairs of 3-flowered cymes ; axes with moderately dense pubescence ; peduncles up to 7×0.8 mm ; pedicels up to 2.3×0.7 mm. Most inflorescences are at the ends of leafy branches, in leaf axils.

Fruit hypanthium cupulate, up to 4.5×3.5 mm, glabrous or glabrescent with evident veins and oil glands ; sepals persistent, triangular, ca. 1×1 mm ; capsule deeply included ; fertile seeds about $1 \times 0.3-0.5$ mm.

DISTRIBUTION AND ECOLOGY. — At present known by only one collection by J.-F. CHERRIER, for whom the species is named, on the Roche Ouaième, near the northeast coast, at 950 m in a shrub association on micaschistes.

OBSERVATIONS. — Although flowering material is not yet available this seems a clearly distinct species. The very small leaves are similar to those of *M. microphylla*, but differ in their prominent oil glands. The flowers in groups of three, the long peduncles and the deeply included capsules are further differences from that species.

A feature which has not been previously observed in other species of subgenus *Metrosideros* is the siting of inflorescences in the axils of unreduced leaves at the ends of branches. In the limited material available only one group of inflorescences arises from a leafless axillary axis of limited growth in the pattern typical of the subgenus.

MATERIAL STUDIED : *MacKee 36013* (récolté par J.-F. Cherrier), Roche Ouaième, 950 m, fr., 25.10.1978 (P, WELTU).

Subgenus **MEARNNSIA** (Merrill) Dawson

Blumea 23 : 9 (1976).

— *Mearnsia* MERRILL, Philipp. J. Sci. 2 : 284 (1907).

Section MEARNNSIA

Section *Mearnsia* ranges from the Phillipines through New Guinea and New Caledonia to New Zealand. The New Caledonian species are shrubs to small trees with attractive bright red flowers. Their many-flowered inflorescences are subtended by pairs of unreduced foliage leaves adjacent to abortive branch apices. Often one or two pairs of leaves below

the branch apex also subtend inflorescences. This is a similar pattern to that of subgenus *Metrosideros*, but the inflorescences in these New Caledonian species of section *Mearnsia* are simple with terminal flowers, while those of subgenus *Metrosideros* are compound and terminate with a vegetative bud. With the exception of *Metrosideros brevistylis* sp. nov. the New Caledonian species often have a pseudodichotomous sympodial branching pattern which is also similar to that of subgenus *Metrosideros*. Several pairs of small bud scales may also be present, but unlike subgenus *Metrosideros*, these become separated by short internodes when buds grow out into branches.

***Metrosideros porphyrea* Schltr.**

Bot. Jahrb. 39 : 206 (1907).

— *Metrosideros porphyrea* var. *lucia* BONATI & PETITM., Bull. Herb. Boiss. 2 (7) : 652 (1907).

— *Mearnsia porphyrea* (SCHLTR.) DIELS, Bot. Jahrb. 57 : 419 (1922).

At scattered localities in higher altitude forests and shrubbery throughout.

Two leaf forms are observable in herbarium specimens : relatively large, apetiolate, orbicular with cordate bases (cf. *Franc 434*, type of *M. porphyrea* var. *lucia*) ; and smaller, shortly petiolate, elliptic with cuneate bases. Field observations on Mt. Humboldt reveal that these leaf forms can be found on the same plant. The orbicular leaf appears to be the juvenile state and plants with this leaf form may flower.

***Metrosideros dolichandra* Schltr. ex Guillaumin**

Bull. Soc. Bot. Fr. 81 : 10 (1934).

In higher altitude cloud forest on two adjoining mountains, Mou and Dzumac, in the southern ultrabasic massif.

As GUILLAUMIN adopted the name proposed by SCHLECHTER the specimen *Franc 159 bis*, Mt. Mou, to which the name was applied has been selected as the lectotype. With the original description GUILLAUMIN cited several other specimens, most of which I refer to my new species *Metrosideros brevistylis*. The large leaves and broad fruits with only slightly included capsules are distinctive features of *M. dolichandra*.

***Metrosideros brevistylis* Dawson, sp. nov. — Pl. 4.**

Frutex vel arbor parva ; ramunculis plerumque 4-costatis, costis saepe alatis, inter sese binatim arcte contingentibus vel coalitis ; foliis ellipticis vel obovatis, 3.5-7 × 1.5-3.5 cm magnitudine ; inflorescentiis longioribus quam latis filamentis staminum 6.5-10 mm longis ; stylis 5-8 mm longis ; capsulis aliquantum inclusis.

TYPE : *MacKee 37035* (holo-, P ; iso-, WELTU).

Shrub to small tree, 2-8 m ; vegetative branching mostly monopodial often with the terminal and the adjacent pair of axillary buds growing strongly together, each of the

latter often also subtending a pair of lateral branches from the axils of its outermost pair of bud scales; twigs and leaves with short, appressed, whitish hairs when young, soon becoming glabrous; twigs usually with 4 often winged ridges closely approximated in pairs, or fused in the lower part of each internode or completely fused, expanding below each leaf insertion into a pair of membranous lobes, free to fused; bark of older stems pale brown and fissured.

Petioles $4-8 \times 1-2$ mm; lamina elliptic to obovate, $3.5-7 \times 1.5-3.5$ cm; tip acuminate to caudate, rarely rounded; base cuneate to rounded then narrowly attenuate along the petiole; margins narrowly incurved; both surfaces with obscure veins, oil glands more or less evident below.

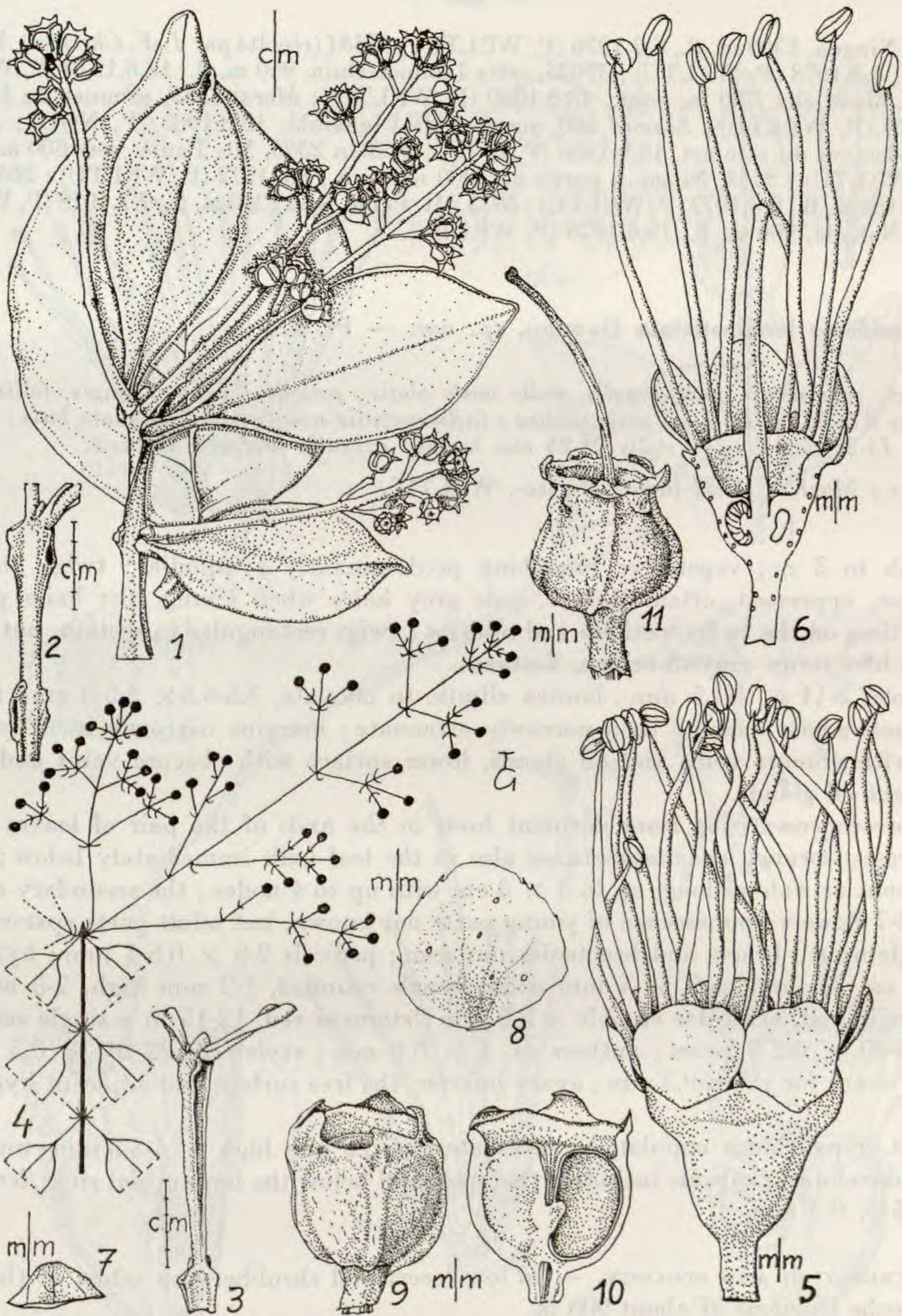
Inflorescences arising from dormant buds in the axils of several successive pairs of leaves at the ends of branchlets terminated by abortive buds; inflorescences generally longer than wide, up to 6×2.5 cm, with up to 5 nodes; the secondary axes each bearing 1-5 flowers; smaller accessory inflorescences often arising in the axils of the lowermost pair of bud scales; inflorescence axes, pedicels and exterior hypanthium moderately pubescent with short, appressed, silvery hairs; bracts and bracteoles small, linear, $0.7-1.2 \times 0.1-0.15$ mm; pedicels $0.3-1.5 \times 0.8-1$ mm; hypanthium campanulate, 2-2.6 mm high \times 3-3.4 mm broad; sepals rounded, ca. 1 mm high \times 2 mm wide; petals red, orbicular, ca. 2.2×2.2 mm; stamens bright red, 12-15 in a single series; filaments $6.5-10 \times 0.2$ mm; anthers $0.7-0.9 \times 0.6$ mm; style red $5-8 \times 0.3-0.5$ mm, set in to the ovary for ca. 0.5 mm; ovary inferior, the free surface and adjacent hypanthium glabrous or with a few short hairs.

Fruit hypanthium cupulate or sometimes urceolate, $3-4 \times 3-4$ mm, glabrous; veins strongly developed; tip of the capsule level with the hypanthial rim or just included; fertile seeds about 1.2×0.3 mm.

DISTRIBUTION AND ECOLOGY. — A fairly common and widely distributed species in cloud forests on metamorphic, sedimentary and ultrabasic mountains. Altitudinal range 600-1640 m.

OBSERVATIONS. — This species has generally been identified as *Metrosideros dolichandra*, but differs from that species and the others in the group in a number of features, including the predominantly monopodial branching; the distinctively winged ridges of the twigs; the long inflorescences and the smaller flowers with much shorter stamens and styles.

MATERIAL STUDIED: *Balansa 2097*, Mt. Humboldt, 1200 m, 12.10.1869 (P); *Baumann 5648*, Mt. Mou, 1200 m, 23.8.1950 (P); *12798*, Mt. Dzumac, 28.4.1951 (P); *Bernardi 9880*, Mt. Mou, 1200-1211 m, 30.7.1965 (P); *10368*, Mt. Ignambi, 1300-1330 m, fr., 19.8.1965 (P); *Compton 1516*, Mt. Ignambi, 2500-4200 ft, fl., 30.7.1914 (P); *Dawson (WELTU 9624)*, Mt. Mou, 400 ft, fl., 8.12.1967 (WELTU); *(WELTU 9627)*, Mt. Ignambi, 1400 m, fl., 12.1962 (WELTU); *(WELTU 12232)*, Plateau de Dogny, 1000 m, fl., 12.9.1974 (WELTU); *(WELTU 12727)*, Roche Ouaième, 800 m, ster., 12.12.1977 (WELTU); *Hürlimann 1959*, crête Diahot-Coulna, vers le Mt. Colnett, 1050 m, 12.9.1951 (P); *Le Rat 1*, Dent de St. Vincent, 1445 m, 7.1909 (P); *MacKee 5630*, Plateau de Dogny, 900-1000 m, 25.10.1956 (P); *6382*, Mt. Panié, 1200 m to summit (about 1640 m), fl., 1.9.1958 (P); *15321*, Plateau de Dogny, 900-1000 m, fl., 17.7.1966 (P, WELTU); *21537*, Mé Maoya, contrefort Sud du Djiaouma, 1100-1200 m, fr., 11.2.1970 (P, WELTU); *25357*, *25638*, Ponérihouen, E. Mt. Aoupinié, fr., fl., 26.4.1972 and 26.6.1972 (P, WELTU); *25775*, Ponérihouen, Mt. Aoupinié, 1000 m, 6.11.1972 (P, WELTU); *29094*, Mt. Ouin, 1200 m, fl., 11.8.1974 (P, WELTU); *31480*,



Pl. 4. — *Metrosideros brevistylis* Dawson : 1, leaves and infructescences (*MacKee 21537*) ; large juvenile leaf (*WELTU 9624*) ; 2, 3, pairs of stem ridges almost completely fused with resulting cavities just below each node ; 4, diagram of one inflorescence of a pair adjacent to an aborted branch apex (black triangle) ; 5, flower habit ; 6, flower (L. S.) ; 7, sepal ; 8, petal ; 9, fruit habit ; 10, fruit (L. S.) ; 11, fruit habit. (2, 3, *Veillon 2659* ; 4, *WELTU 9624* ; 5-8, *MacKee 31480* ; 9, 10, *MacKee 21537* ; 11, *Morat 6289*).

Thio, Mt. Ningua, 1300 m, fl., 6.7.1976 (P, WELTU) ; 35581 (récolté par J.-F. Cherrier), Mt. Panié, 1200 m, fl., 3.8.1978 (P, WELTU) ; 37035, crête Dzumac-Ouin, 950 m, fl., 18.6.1979 (P, WELTU) ; 38119, Mt. Mandjéla, 750 m, bout., 13.5.1980 (P, WELTU) ; Morat 6289, sommet du Mt. Panié, fr., 10.1978 (P, WELTU) ; Schmid 590, sommet de l'Ignambi, 19.8.1965 (P, NOU) ; 1543, Mt. Panié, en dessous du sommet, 19.9.1966 (P, NOU) ; Veillon 2305, Mt. Panié, vers 600 m, fl., 22.6.1971 (P, WELTU) ; 2658, Ninga, à partir de 1000 m, bout., 8.6.1972 (P, WELTU) ; 2659, Ninga, pente E., 1100 m, fl., 8.6.1972 (P, WELTU) ; 3613, Mt. Panié, vers 1300 m, fl., 7.7.1978 (P, WELTU) ; 3442, Mt. Nakada, 900 m, fl., 19.6.1979 (P, WELTU).

Metrosideros longipetiolata Dawson, *sp. nov.* — Pl. 5.

Frutex ; ramunculis quadrangulis, nullo modo alatis ; petiolis 8-11 mm longis, foliis ellipticis vel obovatis 3.5-5.5 × 1.5-3 cm magnitudine ; inflorescentiis non longioribus quam latis ; filamentis staminum 15-20 mm longis ; stylis 22-25 mm longis ; capsulis profunde inclusis.

TYPE : MacKee 19131 (holo-, P ; iso-, WELTU).

Shrub to 3 m ; vegetative branching predominantly sympodial ; twigs and leaves with dense, appressed, often floccose, pale grey hairs when young, the hairs persisting for some time on the twigs, petioles and midribs ; twigs rectangular in section, not winged ; bark on older stems greyish-brown, fissured.

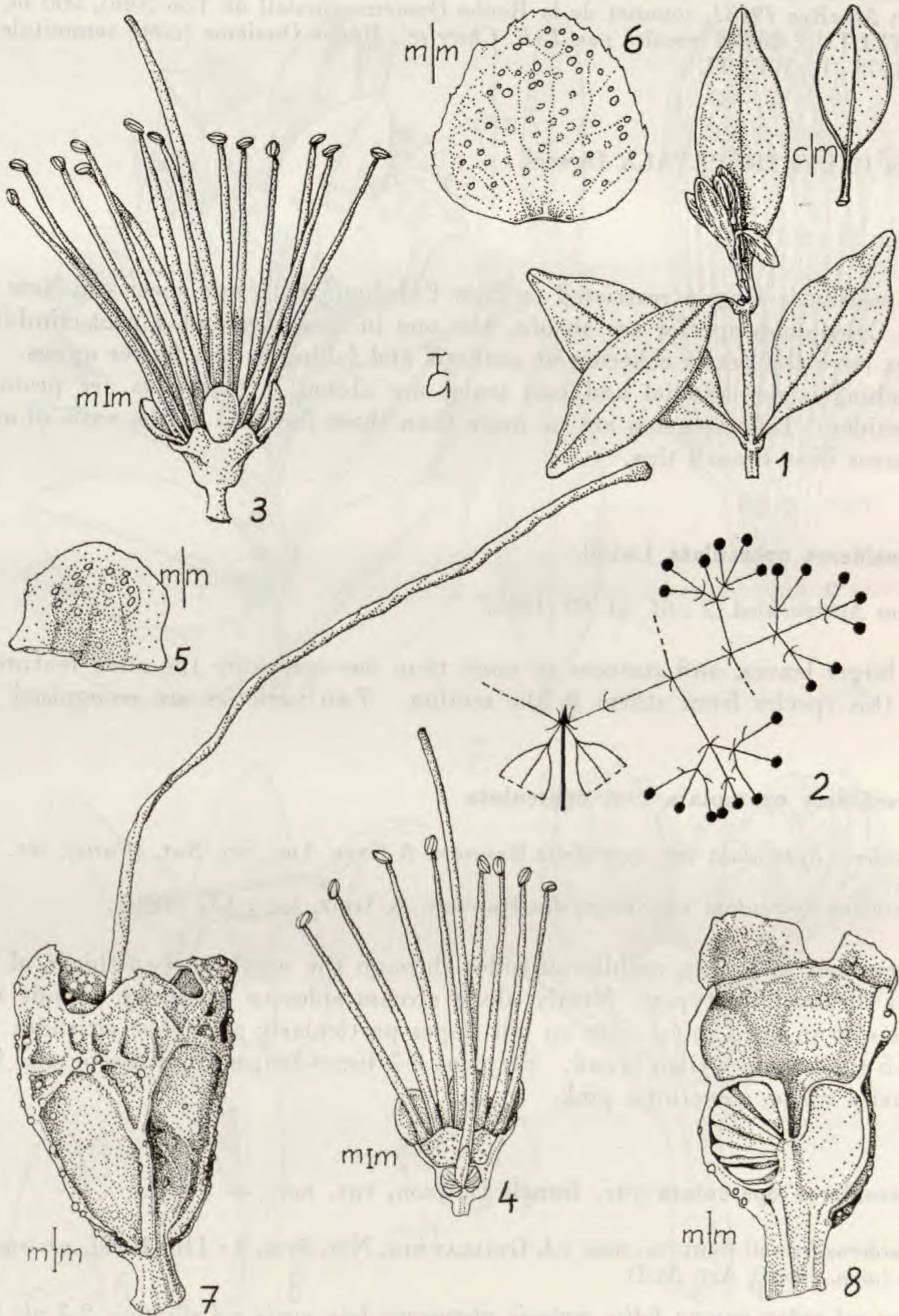
Petioles 8-11 × 1-1.5 mm ; lamina elliptic to obovate, 3.5-5.5 × 1.5-3 cm ; tip acute to attenuate ; base cuneate then narrowly attenuate ; margins narrowly incurved ; upper surface with obscure veins and oil glands, lower surface with obscure veins and more or less evident oil glands.

Inflorescences arising from dormant buds in the axils of the pair of leaves adjacent to an arrested branch apex, sometimes also in the leaf axils immediately below ; inflorescences about as wide as long, up to 3 × 3 cm with up to 4 nodes ; the secondary axes each bearing 2-7 flowers ; pubescence of young parts not known, but adult parts sparsely pubescent to glabrous ; bracts and bracteoles not seen ; pedicels 2-5 × 0.5-1 mm ; hypanthium cupulate ca. 2.5 mm high × 4 mm wide ; sepals rounded, 1-2 mm high, 2-3 mm wide ; petals bright red, orbicular ca. 3.5 × 3.5 mm ; stamens red, 12-15 in a single series ; filaments 15-20 × 0.2-0.3 mm ; anthers ca. 1 × 0.6 mm ; style red, 22-26 × 0.5 mm, set in to the ovary for about 0.3 mm ; ovary inferior, the free surface and adjacent hypanthium glabrous.

Fruit hypanthium cupulate to urceolate, 4.5-5.5 mm high × 4-4.5 mm wide ; veins strongly developed ; capsule included, the apex well below the hypanthial rim ; fertile seeds about 1.5 × 0.3 mm.

DISTRIBUTION AND ECOLOGY. — In low forest and shrubbery on schist at the summit of the Roche Ouaième at about 900 m.

OBSERVATIONS. — This species is similar to *M. porphyrea* in its deeply included capsules and narrow fruits, but the stamens and styles are longer and the leaves larger. *Metrosideros longipetiolata* differs from all the other species in this group by its long petioles and more persistent pubescence.



Pl. 5. — *Metrosideros longipetiolata* Dawson : 1, foliage ; 2, diagram of one infructescence of a pair adjacent to an aborted branch apex (black triangle) ; 3, flower habit ; 4, flower (L. S.) ; 5, sepal ; 6, petal ; 7, fruit habit ; 8, fruit, L. S. (1, 2, WELTU 12731 ; 3-6, MacKee 19131 ; 7, 8, MacKee 35998).

MATERIAL STUDIED : Dawson (WELTU 12731), Roche Ouaième, 900 m, fr., 12.12.1977 (WELTU); MacKee 19131, sommet de la Roche Ouaième (massif de Ton-Non), 900 m, fl., 13.7.1969 (P, WELTU); 35998 (récolté par J.-F. Cherrier), Roche Ouaième (crête sommitale), 900 m, fr., 25.10.1978 (P, WELTU).

Section CALYPTROPETALA Dawson

Blumea 23 : 9 (1976).

This section is largely restricted to New Caledonia with one species in New Zealand. The New Caledonian species are shrubs, the one in New Zealand a root-climbing liane. All species have the petals cohering at anthesis and falling as the flower opens.

Branching is monopodial and bud scales are absent. Oil glands are prominent on leaf undersides. Inflorescences are no more than three-flowered in the axils of unreduced foliage leaves near branch tips.

Metrosideros operculata Labill.

Sertum Austrocaled. 2 : 61, pl. 60 (1825).

The larger leaves, and stamens in more than one series are the chief features distinguishing this species from others in the section. Two varieties are recognised here.

Metrosideros operculata var. **operculata**

— *Metrosideros operculata* var. *myrtifolia* BRONGN. & GRIS, Ann. Sci. Nat. (Paris), sér. 5, 2 : 137 (1864).

— *Metrosideros operculata* var. *longifolia* BRONGN. & GRIS, *l.c.* : 137 (1864).

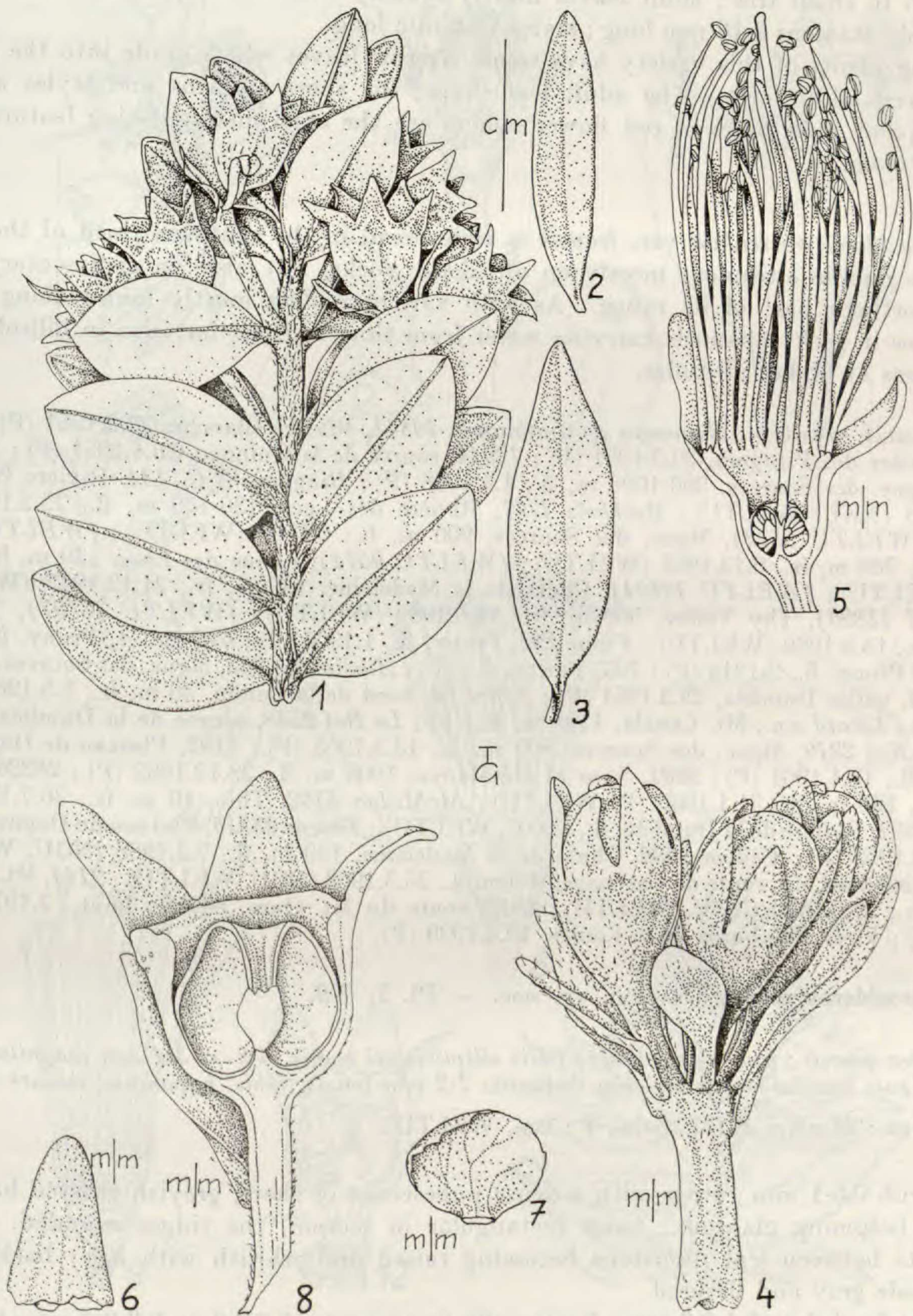
Widespread at low to middle altitudes through the northern two-thirds of the main island on rocks of all types. Mostly along stream sides or on rocky islands in stream beds, but also in open moist sites on hill slopes particularly at higher altitudes. Narrow leaves, 4-5 times longer than broad. Stamens 4-5 times longer than the petals, 13-18 mm long, usually white, sometimes pink.

Metrosideros operculata var. **francii** Dawson, *var. nov.* — Pl. 6.

— *Metrosideros francii* SCHLTR., *mss.* c.f. GUILLAUMIN, Not. Syst. 1 : 110 (1909), *pro syn. M. operculata* (*nom. inval.*, Art. 34.1).

Frutex vel arbor parva; foliis maturis plerumque late ovatis vel ellipticis 2-3 plo longioribus quam latis; filamentis staminum 6-10 mm longis stylis 7-15 mm longis; floribus vulgo roseis nonnumquam rubris.

TYPUS : Franc 295 (holo-, P).



Pl. 6. — *Metrosideros operculata* var. *francii* Dawson : 1, foliage and infructescences ; 2, juvenile leaf ; 3, adult leaf ; 4, inflorescence with flower buds, bracts and bracteoles ; 5, flower (L. S.) ; 6, sepal ; 7, petal ; 8, fruit, L. S. (1, 2, WELTU 13896 ; 3, Veillon 1496 ; 4-7, MacKee 20226 ; 8, Veillon 2144).

Shrub to small tree; adult leaves mostly broadly ovate or elliptic, 2-3 times longer than broad; stamens 6-10 mm long; styles 7-15 mm long.

Young plants of this variety have small, narrow leaves which grade into the usually broad-leaved adult form. The adult leaf shape, the short stamens and styles and the more frequent pink or even red flower colour are the chief distinguishing features from var. *operculata*.

Metrosideros operculata var. *francii* is widespread in the southern third of the island at low to middle altitudes; mostly on ultrabasic rocks, but also on sedimentary rocks in the northern part of its range. As with var. *operculata* mostly found along stream margins or in rocky channels carrying water from time to time, but also in hillside shrub associations at higher altitudes.

MATERIAL STUDIED: *Baumann & Guillaumin 10841*, Rivière Blanche, 22.2.1951 (P); *11551*, haute Rivière des Pirogues, 29.3.1951 (P); *12944*, source de la Ouinnée, 30.4.1951 (P); *Bernardi 12449*, Mgne. des Sources, 900-1000 m, fl., 1.4.1968 (P); *Braggins N.C. 134*, Rivière Bleue, fl., 21.12.1973 (AKU, WELTU); *Buchholz 1727*, Rivière des Lacs, 130-140 m, fl., 22.2.1948 (P); *Dawson (WELTU 9572)*, Mgne. des Sources, 900 m, fr., 6.1965 (WELTU); (*WELTU 9573*), Mt. Bouo, 700 m, fr., 6.12.1967 (WELTU); (*WELTU 9574*), Plaine des Lacs, 120 m, fr., 15.12.1967 (WELTU); (*WELTU 12894*), Chute de la Madeleine, 120 m, fr., 21.12.1977 (WELTU); (*WELTU 13896*), Thy Valley, 500 m, fr., 18.5.1980 (WELTU); (*WELTU 13897*), Tontouta Valley, fr., 13.5.1980 (WELTU); *Franc 295*, Prony, fl., 1.1906 (P); *696 sér. A*, Prony, fl., 1.1907 (P); *696*, Prony, fl., 2.1914 (P); *703*, Farino, fl., (P); *Hürlimann 968*, Mgne. des Sources, 7.3.1951 (P); *1113*, vallée Dumbéa, 29.3.1951 (P); *Jaffré 24*, bord de la Lembi, 50 m, fr., 5.5.1968 (NOU, WELTU); *Lécard s.n.*, Mt. Canala, 1100 m, fl., (P); *Le Rat 2548*, source de la Dumbéa, 10.1905 (P); *MacKee 2210*, Mgne. des Sources, 800 m, fl., 13.3.1955 (P); *8192*, Plateau de Dogny, 900-1000 m, fl., 18.1.1961 (P); *9901*, Spur of Mé Maoya, 1000 m, fl., 28.12.1962 (P); *20226*, Rivière des Lacs, 200 m, fl., 31.1.1969 (P, WELTU); *McMillan 5162*, Thio, 10 m, fr., 26.7.1952 (K); *Schmid 2291*, Rivière de la Dumbéa, fl., (NOU, WELTU); *Thorne 28315*, Plateau de Dogny, 1000 m, fr., 29.10.1959 (P); *Veillon 1596*, Chute de la Madeleine, 150 m, fl., 7.2.1968 (NOU, WELTU); *1675*, Plaine des Lacs, route du Carénage, 200 m, fl., 25.3.1968 (NOU, WELTU); *2144*, Mt. Dzumac, 800 m, fr., 27.5.1970 (NOU, WELTU); *2812*, route du Mt. Ouin, 800 m, bout., 2.1973 (NOU, WELTU); *Virot 108*, bords de la Coulée, 19.6.1939 (P).

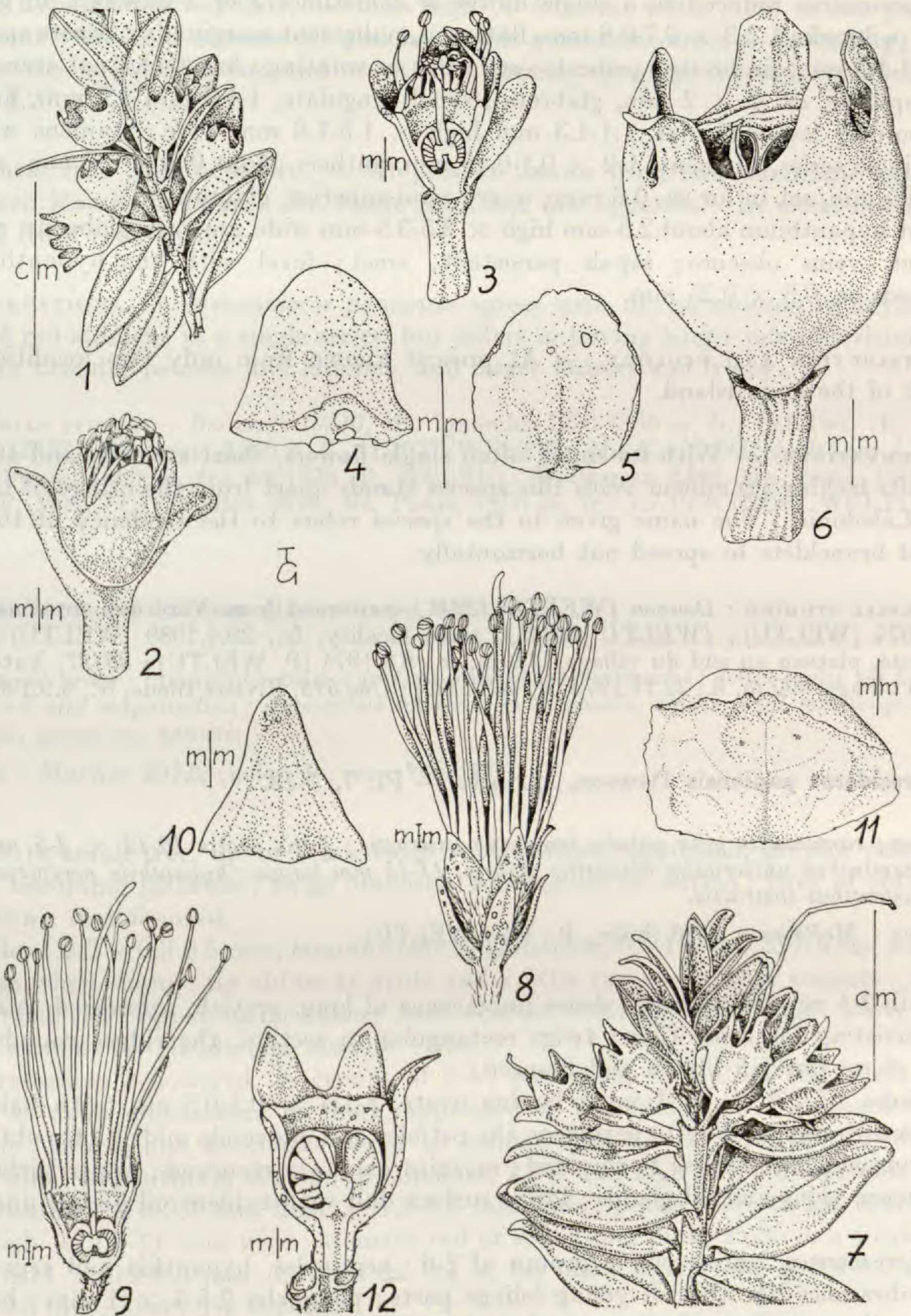
***Metrosideros patens* Dawson, sp. nov. — Pl. 7, 1-6.**

Frutex parvus; ramis patentibus; foliis ellipticis vel ovatis, 6-8 × 3-4 mm magnitudine; floribus exiguis staminibus uniseriatim dispositis 1-2 mm longis, albis, hypanthio obscure nervato.

TYPE: *MacKee 36127* (holo-, P; iso-, WELTU).

Shrub 0.5-1 m; twigs with a dense pubescence of short, greyish twisted hairs when young, becoming glabrous; twigs rectangular in section, the ridges rounded, the stem segments between leaf insertions becoming raised and whitish with age; bark of older stems pale grey and fissured.

Petioles 1-2 × 0.4-0.6 mm; lamina elliptic to ovate, 0.6-0.8 × 0.3-0.4 cm; tip obtuse to rounded; base obtuse to rounded; margins narrowly incurved; upper surface shiny with obscure veins and oil glands, lower surface dull with evident oil glands and obscure veins.



Pl. 7. — *Metrosideros patens* Dawson : 1, foliage and infructescences ; 2, flower habit ; 3, flower (L. S.) ; 4, sepal ; 5, petal ; 6, fruit habit. (1, 6, WELTU 14247 ; 2-5, MacKee 36127). — *Metrosideros paniensis* Dawson : 7, foliage and infructescences ; 8, flower habit ; 9, flower (L. S.) ; 10, sepal ; 11, petal ; 12, fruit, L. S. (7, 12, Veillon 3612 ; 8-11, WELTU 12737).

Inflorescences reduced to a single flower or sometimes 2 or 3-flowered, in groups of up to 6; peduncles $1.2-3 \times 0.7-0.8$ mm, flattened, pubescent marginally; bracts spatulate, $2.5-4 \times 1-1.5$ mm, fimbriate; pedicels very short or wanting; bracteoles not seen; hypanthium cupulate, ca. 2×2 mm, glabrous; sepals lingulate, $1-1.2 \times 1-1.2$ mm, fimbriate; petals more or less orbicular, $1.1-1.3$ mm high \times $1.5-1.6$ mm wide; stamens white, 20-25 in a single series, filaments $1-2 \times 0.1-0.15$ mm, anthers about 0.3×0.2 mm, style $1.5-1.8 \times 0.25$ mm, set in for ca. 0.6 mm; ovary semi-superior, glabrous.

Fruit hypanthium about 2.5 mm high \times 2.5-3.5 mm wide, smooth, glabrous, oil glands prominent, veins obscure; sepals persistent, erect; level with the hypanthial rim; fertile seeds ca. 0.5×0.25 mm.

DISTRIBUTION AND ECOLOGY. — At present known from only two localities in the far south of the main island.

OBSERVATIONS. — With its small, often single flowers, short stamens and styles and small fruits lacking prominent veins this species stands apart from the others of the group in New Caledonia. The name given to the species refers to the tendency of the rather elongated branchlets to spread out horizontally.

MATERIAL STUDIED: *Dawson* (WELTU 12217), new road from Yaté dam to coast, 300 m, fr., 8.9.1974 (WELTU); (WELTU 14247), same locality, fr., 29.4.1980 (WELTU); *MacKee* 29233, Yaté, plateau au sud du village, 300 m, fr., 8.9.1974 (P, WELTU); 36127, Yaté, plateau au sud du village, 300 m, fl., 22.11.1978 (P, WELTU); *Uhe* 518, Rivière Bleue, fr., 5.9.1963 (NOU).

Metrosideros paniensis Dawson, *sp. nov.* — Pl. 7, 7-12.

Frutex; ramunculis pilis patulis longisque instructis; foliis ovatis 10-14 \times 4-5 mm magnitudine; staminibus uniseriatim dispositis, rubris, 11-15 mm longis; hypanthiis perspicue nervatis, pilis persistentibus instructis.

TYPE: *McPherson* 2386 (holo-, P; iso-, WELTU).

Shrub 2-4 m; twigs with a dense pubescence of long, greyish, appressed to spreading hairs, persisting for some time; twigs rectangular in section, the ridges rounded; bark of older stems darkish brown and fissured.

Petioles $1.5-2.5 \times 0.6-1$ mm; lamina ovate, $1-1.4 \times 0.4-0.5$ cm, with hairs as for twigs when young, tending to persist on the petioles and underside midrib; tip obtuse and a little recurved; base obtuse to rounded; margins narrowly recurved; upper surface glossy with obscure veins and oil glands; lower surface dull with evident oil glands and obscure veins.

Inflorescences 3-flowered, in groups of 2-6; peduncles, hypanthia and sepals with a dense pubescence like that of young foliage parts; peduncles $2.5-4 \times 1$ mm; bracts and bracteoles linear to lanceolate, ca. $4-4.5 \times 0.8-1.3$ mm; pedicels up to 1×1 mm; hypanthium cupulate, 3-5 mm high \times 4-6 mm wide; sepals more or less orbicular, ca. 4×4 mm; stamens red, 25-30 in a single series, filaments $11-15 \times 0.3$ mm; anthers ca. 0.7×0.6 mm; style $14-17 \times 0.5$ mm, set in for ca. 0.4 mm; ovary 1/2 to 1/3 superior.

Fruit hypanthium cupulate, 4-5 mm high \times 4-5 mm wide, more or less pubescent, with evident veins and obscure oil glands; sepals persistent, erect to spreading; capsule level with the hypanthial rim and eventually forming openings through its sides; fertile seeds ca. 1.2 \times 0.3 mm.

DISTRIBUTION AND ECOLOGY. — At present known from two mountain tops in the far northern Massif du Panié: Mt. Panié itself and Mt. Ignambi. In moist low forest or shrubland from 1300-1550 m.

OBSERVATIONS. — *Metrosideros paniensis* agrees with *M. cacuminum* in having small leaves and red stamens in a single series, but differs in having longer more persistent hairs, leaves with broader petioles and laminae, and larger flowers and fruits.

MATERIAL STUDIED: *Bernardi 10316*, Mt. Ignambi, 1290-1330 m, fr., 19.8.1965 (K); *Brinon (WELTU 12737)*, Mt. Panié, 1500 m, fl., 11.1977 (WELTU); *MacKee 35593* (récolté par *J.-F. Cherrier*), Mt. Panié, 1500 m, fr., 3.8.1978 (P, WELTU); *McPherson 2386*, Mt. Panié, 1600 m, fl., 6.2.1980 (P, WELTU); *Veillon 3612*, Mt. Panié, 1550 m, fr., 7.7.1978 (NOU, WELTU).

Metrosideros cacuminum Dawson, *sp. nov.* — Pl. 8.

Frutex vel arbor; ramunculis pilis appressis brevibusque instructis; foliis ovatis vel lanceolatis 7-14 \times 2.5-4 mm magnitudine; staminibus uniseriatim dispositis, rubris, 8-11 mm longis, hypanthiis glabris, perspicue nervatis.

TYPE: *MacKee 20142* (holo-, P; iso-, WELTU).

Shrub to small tree, up to 7 m; twigs with a short, appressed, greyish pubescence, gradually becoming glabrous; twigs obscurely rectangular in section; bark of older stems greyish-brown and fissured.

Petioles 1.2-2 \times 0.3-0.5 mm; lamina ovate to lanceolate, 0.7-1.4 \times 0.25-0.4 cm, with hairs as for twigs when young; tip obtuse to acute and a little recurved; base cuneate; margins narrowly recurved; upper surface shiny with obscure veins and oil glands; lower surface dull with evident oil glands and obscure veins.

Inflorescences 3-flowered, in groups of 2-4; peduncles, hypanthia and sepals with a moderate to dense pubescence of short, appressed to spreading hairs; peduncles 3-5 \times 0.8-1.3 mm; bracts and bracteoles linear to oblanceolate 3-5 \times 1-1.3 mm; pedicels up to 1 \times 1 mm; hypanthium obconic to cupulate, 2.3-3 mm high \times 3-3.5 mm wide; sepals acute to rounded, 1.5-2.3 mm high \times 1.8-2.3 mm wide; petals more or less orbicular, 3-3.5 mm high \times 3.5-3.8 mm wide; stamens red or sometimes pink, 25-35 in a single series, filaments 8-11 \times 0.2-0.3 mm; anthers ca. 0.7 \times 0.5 mm; style 11-16 \times 0.4-0.7 mm, set in for ca. 0.5 mm; ovary 1/2 superior.

Fruit hypanthium cupulate to obconic, 3-3.5 mm high \times 3.5-4 mm wide, glabrous, with more or less evident veins and obscure oil glands; sepals persistent, erect; capsule level with the hypanthial rim and eventually forming openings through its sides; seeds not seen.

DISTRIBUTION AND ECOLOGY. — Found at middle to higher altitude, 700-1200 m, on mountains near the northeast coast in moist low forest or shrubland. Rock type peridotite in the south of its range, schist further north.

OBSERVATIONS. — See under *M. paniensis*.

MATERIAL STUDIED : *Dawson* (WELTU 13898), Mt. Mandjéla, 700 m, fl., 24.5.1980 (WELTU); *MacKee* 20142, Haute Tiwaka, contrefort est du Tchinguou, 800 m, fl., 6.1.1969 (P, WELTU); 34452 (récolté par *J.-P. Cherrier*), Roche Ouaième, 850 m, fl., 22.12.1977 (P, WELTU); 36389 (récolté par *J.-F. Cherrier*), Haute Amoa, Mt. Grandié, 950 m, fl., 5.1.1979 (P, WELTU); *McPherson* 3723, Mt. Panié, 1200 m, fr., 3.4.1981 (P, WELTU).

Metrosideros* aff. *paniensis

This form is only known from the summit ridge of the Roche Ouaième in shrubbery at about 900 m. The fruits are similar to those of *Metrosideros paniensis*, but the leaves are broadly ovate to suborbicular with rounded tips. Flowers have not been seen, but on the young fruits of *MacKee* 19132 a few styles and stamens have persisted. They are shorter than those of *M. paniensis* : styles about 10 mm long and stamens about 5 mm long.

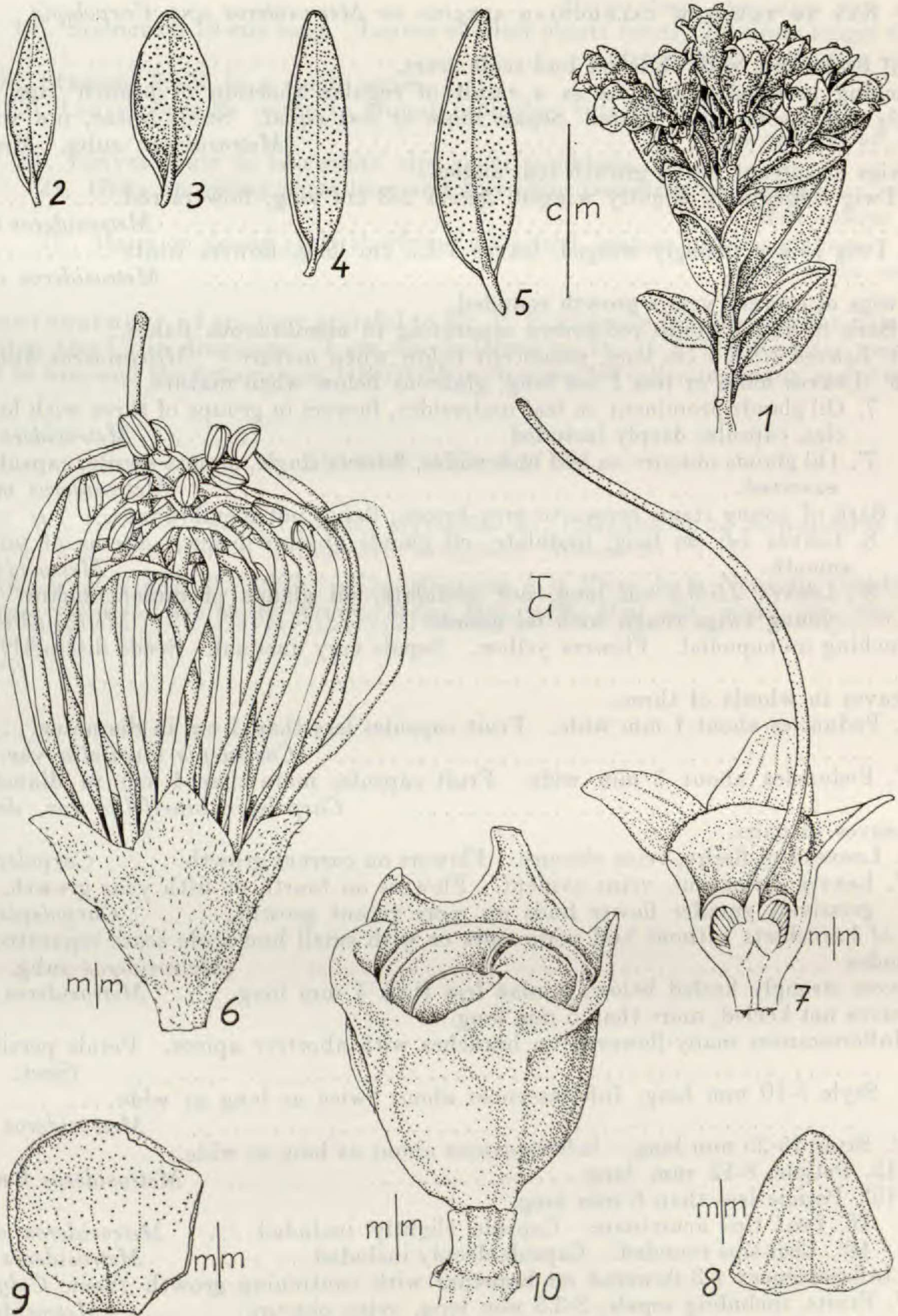
SECTION UNCERTAIN

***Metrosideros tetrasticha* Guillaumin**

Mém. Mus. natn. Hist. nat., n.s., Bot. 4 : 31 (1953).

Known from two adjacent mountain tops, Humboldt and Kouakoué, in the southern ultrabasic massif. In low shrub associations from 1300-1630 m.

With its dense, rounded crowns and very small, keeled leaves close set in 4 rows on each branchlet this is a very distinctive species. Dehiscing to old fruits, young and a few advanced flower buds have been collected, but no flowers. The lack of bud scales, monopodial branching and the single-flowered inflorescences in leaf axils bring it closest to section *Calyptrapetala*, but it is not yet known whether or not the petals fall at anthesis. In the species of section *Calyptrapetala* the petals in the bud are almost hemispherical and fit closely into each other. In the few advanced flower buds of *M. tetrasticha* the petals are narrower and not so close-fitting, which may suggest that they persist in the flower. Also, unlike subgenus *Mearnsia*, but like subgenus *Metrosideros* and *Carpolepis*, in this species the base of the style is moved away from the placentas by tissue extension during enlargement of the fruit. Perhaps when complete information is available *Metrosideros tetrasticha* will warrant a section of its own.



Pl. 8. — *Metrosideros cacuminum* Dawson : 1, foliage and inflorescences ; 2-5, leaves (*MacKee* 34452, 20142, 36389, 36389) ; 6, flower habit ; 7, flower (L. S.) ; 8, sepal ; 9, petal ; 10, fruit habit. (1, 6-9, *MacKee* 20142 ; 10, *WELTU* 13398).

KEY TO THE NEW CALEDONIAN SPECIES OF *Metrosideros* AND *Carpolepis*

1. Bases of branchlets with close-set bud scale scars.
 2. Branching pseudodichotomous as a result of regular abortion of branch tips. Flowers mostly red¹, sometimes white. Sepals more or less equal. Seeds linear, not winged....
..... (*Metrosideros* subg. *Metrosideros*)
 3. Twigs of current year's growth four-angled.
 4. Twig ridges only slightly winged, leaves 2-3 cm long, flowers red.....
..... *Metrosideros engleriana*
 - 4'. Twig ridges strongly winged, leaves 1-1.5 cm long, flowers white.....
..... *Metrosideros oreomyrtus*
 - 3'. Twigs of current year's growth rounded.
 5. Bark of young stems red-brown separating in membranous flakes.
 6. Leaves 2.5-4.5 cm long, pubescent below when mature. *Metrosideros humboldtiana*
 - 6'. Leaves more or less 1 cm long, glabrous below when mature.
 7. Oil glands prominent on leaf undersides, flowers in groups of three with long peduncles, capsules deeply included..... *Metrosideros cherrieri*
 - 7'. Oil glands obscure on leaf undersides, flowers single, almost sessile, capsules slightly exerted..... *Metrosideros microphylla*
 - 5'. Bark of young stems brown to grey-brown, flakes not membranous.
 8. Leaves 4-6 cm long, undulate, oil glands obscure below. Stems of young twigs smooth..... *Metrosideros nitida*
 - 8'. Leaves 2.5-3.5 cm long, not undulate, oil glands prominent below. Stems of young twigs rough with oil glands..... *Metrosideros punctata*
- 2'. Branching monopodial. Flowers yellow. Sepals very unequal. Seeds distinctly winged..
..... (*Carpolepis*)
 9. Leaves in whorls of three.
 10. Peduncles about 1 mm wide. Fruit capsules less than 1 cm in diameter.....
..... *Carpolepis laurifolia* var. *laurifolia*
 - 10'. Peduncles about 2 mm wide. Fruit capsules more than 1 cm in diameter.....
..... *Carpolepis laurifolia* var. *demonstrans*
 - 9'. Leaves in pairs.
 11. Leaves sub-fleshy, veins obscure. Flowers on current growth.... *Carpolepis elegans*
 - 11'. Leaves coriaceous, veins evident. Flowers on fourth or fifth year growth, with progressively smaller flower buds on more recent growth..... *Carpolepis tardiflora*
- 1'. Bases of branchlets without bud scale scars or with small bud scale scars separated by short internodes..... (*Metrosideros* subg. *Mearnsia*)
 12. Leaves strongly keeled below, lamina less than 4 mm long.... *Metrosideros tetrasticha*
 - 12'. Leaves not keeled, more than 5 mm long.
 13. Inflorescences many-flowered on branches with abortive apices. Petals persistent
..... (Sect. *Mearnsia*)
 14. Style 5-10 mm long. Inflorescences about twice as long as wide.....
..... *Metrosideros brevistylis*
 - 14'. Style 15-25 mm long. Inflorescences about as long as wide.
 15. Petiole 8-12 mm long..... *Metrosideros longipetiolata*
 - 15'. Petiole less than 6 mm long.
 16. Leaf tips acuminate. Capsule slightly included.... *Metrosideros dolichandra*
 - 16'. Leaf tips rounded. Capsule deeply included..... *Metrosideros porphyrea*
 - 13'. Inflorescences 1-3-flowered on branches with continuing growth (Sect. *Calypotropetala*)
 17. Fruits, including sepals, 3-3.5 mm long, veins obscure..... *Metrosideros patens*
 - 17'. Fruits, including sepals, more than 4 mm long, veins evident.
 18. Stamens 50-120 in 2-3 series.

1. Occasional plants of otherwise red-flowered species may have yellow flowers.

- 19. Stamens 13-18 mm long. Leaves of adult plants 4-5 times longer than wide..
..... *Metrosideros operculata* var. *operculata*
- 19'. Stamens 6-10 mm long. Leaves of adult plants mostly 2-3 times longer than wide.
..... *Metrosideros operculata* var. *francii*
- 18'. Stamens 25-35 in a single series.
- 20. Leaves broadly ovate to almost orbicular, tips rounded.....
..... *Metrosideros* aff. *paniensis*
- 20'. Leaves ovate to lanceolate, tips acute to obtuse.
- 21. Hairs on young parts long and spreading persisting on petioles.....
..... *Metrosideros paniensis*
- 21'. Hairs on young parts short and appressed, mature petioles glabrous.....
..... *Metrosideros cacuminum*

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